

**Bonneville Power Administration
Fish and Wildlife Program FY99 Proposal**

Section 1. General administrative information

**Evaluate Movement Patterns Of Bull Trout In
Dworshak Reservoir.**

Bonneville project number, if an ongoing project 9055

Business name of agency, institution or organization requesting funding
Idaho Department of Fish and Game

Business acronym (if appropriate) IDFG

Proposal contact person or principal investigator:

Name Tim Cochnauer
Mailing Address 1540 Warner
City, ST Zip Lewiston, ID 83501
Phone 208-799-5010
Fax 208-799-5012
Email address tcochnau@idfg.state.id.us

Subcontractors.

Organization	Mailing Address	City, ST Zip	Contact Name
College of Forestry, Wildlife and Range	University of Idaho	Moscow, ID 83843	Dr. George LaBar

NPPC Program Measure Number(s) which this project addresses.
10.3C

NMFS Biological Opinion Number(s) which this project addresses.

Other planning document references.

State of Idaho Bull Trout Conservation Plan; Idaho Department of Fish and Game Fish Management Plan, 1996-2000; Columbia Basin Fish and Wildlife Authority Draft Multi-year Implementation Plan

Subbasin.Clearwater River Drainage, Idaho

Short description.

Evaluate the movement patterns of bull trout (*Salvelinus confluentus*) in Dworshak Reservoir and N.F. Clearwater River above the reservoir to determine the extent of movement downstream of Dworshak Dam and lost to the drainage.

Section 2. Key words

Mark	Programmatic Categories	Mark	Activities	Mark	Project Types
	Anadromous fish		Construction		Watershed
X	Resident fish		O & M		Biodiversity/genetics
	Wildlife		Production	X	Population dynamics
	Oceans/estuaries		Research		Ecosystems
	Climate		Monitoring/eval.		Flow/survival
	Other	X	Resource mgmt		Fish disease
			Planning/admin.		Supplementation
			Enforcement		Wildlife habitat en-
			Acquisitions		hancement/restoration

Other keywords.

Section 3. Relationships to other Bonneville projects

Project #	Project title/description	Nature of relationship

Section 4. Objectives, tasks and schedules***Objectives and tasks***

Obj 1,2,3	Objective	Task a,b,c	Task
1	Determine movement patterns of bull trout in Dworshak Reservoir and N.F. Clearwater	a	Capture bull trout in the lower N.F. Clearwater River and upper Dworshak Reservoir by angling

	River above Dworshak Reservoir		and netting techniques. Document findings.
		b	Implant radio transmitters in abdominal cavity of bull trout (350mm) annually for 3 years. Bull trout less than 350 mm will be marked by fin clip or VIT only. All bull trout will be marked with PIT tags. Document findings.
		c	Track radio tagged bull trout in reservoir and drainage, with particular emphasis below Dworshak Dam. Document findings.
		d	Conduct systematic electrofishing in N.F. Clearwater River below Dworshak Dam , noting any marked bull trout. Continue systematic netting in upper reservoir to accomplish Task a and observe for any marked fish. Document findings.
2	Develop and implement strategies to minimize entrainment.	a	Coordinate with the kokanee entrainment study (Project No. 87-99) and develop system that addresses bull trout entrainment.
		b	Implement strategy to minimize bull trout entrainment.

Objective schedules and costs

Objective #	Start Date mm/yyyy	End Date mm/yyyy	Cost %
1	1/1998	11/2002	75.00%
2	11/2002	11/2004	25.00%
			TOTAL 100.00%

Schedule constraints.

Completion date.

2004

Section 5. Budget

FY99 budget by line item

Item	Note	FY99
Personnel	Fishery technician & Biological Aide	\$24,930
Fringe benefits	@36%	\$8,975
Supplies, materials, non-expendable property	VI tags, radio tags, meals, nets, etc.	\$14,000
Operations & maintenance	Vehicle rental, flights	\$9,200
Capital acquisitions or improvements (e.g. land, buildings, major equip.)	PIT tag reader, Radio receiver	\$6,500
PIT tags	# of tags: 200	580
Travel		2000
Indirect costs	@21.3%	13655
Subcontracts	University of Idaho	\$5,000
Other		
TOTAL		\$84,840

Outyear costs

Outyear costs	FY2000	FY01	FY02	FY03
Total budget	\$81,648	\$85,730	\$80,000	\$75,000
O&M as % of total	12.00%	15.00%	15.00%	10.00%

Section 6. Abstract

Little information is known about bull trout *Salvelinus confluentus* in the North Fork Clearwater River drainage. Surveys by the Idaho Department of Fish and Game have documented bull trout in several streams and in Dworshak Reservoir. Recent studies by Idaho Department of Fish and Game in southern Idaho reservoirs have documented movement of bull trout downstream past the dams. The significance of the loss of these fish to the population viability is unknown, but could be significant. Historically, prior to Dworshak Dam construction, these fish probably moved out of the North Fork Clearwater River drainage into the mainstem Clearwater River and bull trout from other tributaries moved into the North Fork perpetuating a genetic interchange throughout the Clearwater River drainage. This study is designed to determine if bull trout move downstream of Dworshak Dam and to assess how significant this loss is to the population in the North Fork Clearwater drainage. Movement of bull trout within the reservoir will be monitored by radio tags and other physical marks. Sampling for marked, but non-radio tagged fish will be conducted by netting, electroshocking, and angling techniques in the reservoir and

below Dworshak Dam. The study will be conducted over a six-year period and will be incorporated into the Graduate School at the University of Idaho, Department of Fish and Wildlife.

Section 7. Project description

a. Technical and/or scientific background.

Bull trout *Salvelinus confluentus* have been observed throughout the North Fork Clearwater River drainage and in Dworshak Reservoir proper. Historically these fish have had the opportunity to interchange with other bull trout populations in the Clearwater River drainage (Clearwater National Forest, 1995). With construction of Dworshak Dam near the mouth of the North Fork Clearwater River, movement of bull trout is limited to downstream passage only. There is no avenue by which bull trout can move upstream past Dworshak Dam. Rieman and McIntyre (1993) indicate that characteristics of bull trout populations are consistent with the metapopulation concept that purports the need to protect genetic variation available for adaptation to change. The maintenance of adequate migratory corridors throughout the Clearwater River drainage may be an important feature to ensure the genetic interchange suggested. With construction of Dworshak Dam the corridor into the North Fork Clearwater River drainage is no longer available. Bull trout moving from other tributaries of the Clearwater River can no longer mix with those fish above Dworshak Dam. Similarly, bull trout that move downstream past the dam can no longer return to the North Fork Clearwater River. Again, Rieman and McIntyre suggest that isolated populations face serious risk of extinction, even with no further loss of habitat.

Ratliff and Howell (1992) found that where bull trout evolved with large population of juvenile salmon, the fish declined when salmon declined. Bull trout in rivers may parallel the distribution of potential prey (Carl 1985; Shepard and others 1984b). Because Dworshak Dam effectively blocks the migration of anadromous fish into the North Fork Clearwater River drainage, the abundance of potential prey (juvenile salmon and steelhead) have diminished. Bull trout in the drainage may seek abundant prey in Dworshak Reservoir as kokanee salmon populations have prospered in the reservoir. Bull trout inhabiting the reservoir are at risk of moving through the reservoir and out of the North Fork Clearwater River drainage past Dworshak Dam. Idaho Department of Fish and Game studies in the Boise River system have found bull trout captured and tagged in reservoirs have moved downstream through dams and lost to population viability. Similar movements of bull trout may be occurring in the North Fork Clearwater River system.

The impact of severing the migratory corridor up the North Fork Clearwater River could be critical in sustaining bull trout upstream of Dworshak Dam. Bull trout populations are prone to habitat disruption and fragmentation (Rieman and McIntyre 1993). Without more information the disruption of this migratory corridor can only be viewed as a threat to the persistence of the North Fork Clearwater River bull trout population.

This study is designed to describe the movement of bull trout in the North Fork Clearwater River drainage in relation to Dworshak Reservoir, to assess the extent of movement downstream of Dworshak Dam, and to develop (and implement) strategies to prevent entrainment.

The overall goal of the project is to protect native bull trout population in the North Fork Clearwater River above Dworshak Dam. This project is closely related to several planning documents. The system-wide goal in the NPPC's Fish and Wildlife Program (FWP) (NPPC 1994, amended 1995) is "a healthy columbia Basin, one that supports both human settlement and the long-term sustainability of native fish and wildlife species in native habitats....". The resident fish goal mirrors the system-wide goal by emphasizing the long-term sustainability of native species in native habitats where possible....". The goal of the CBFWA draft resident fish multi-year implementation plan is to promote the long-term viability of native species in native habitats (CBFWA 1997). Idaho Department of Fish and Game's fish management plan (IDFG 1996) states that wild native, self sustaining fish populations are management priority as is protection and restoration of habitats and water quality. One of the goals of the plan is to maintain and restore wild, native fish populations. This project also relates to the State of Idaho's Bull Trout Conservation Plan (State of Idaho 1996). The mission of the plan is to "maintain and/or restore complex interacting groups of bull trout populations throughout their native range in Idaho." The goals of the plan are to "maintain the conditions of those areas presently supporting critical bull trout habitat" and "institute recovery strategies that produce measurable improvement in the status, abundance, and habitats of bull trout."

References:

- Carl, L. 1985. Management plan for bull trout in Alberta. In: MacDonald, D.D., ed. Proceedings of the Flathead River basin bull trout biology and population dynamics modeling information exchange. Cranbrook, BC: British Columbia Ministry of Environment, Fisheries Branch: 71-80.
- Clearwater National Forest, 1995. Biological assessment for bull trout. North Fork Clearwater River – Key watershed analysis area. Clearwater River subbasin. Assessment of ongoing and proposed projects. Clearwater National Forest, May 30, 1995.
- Columbia Basin Fish and Wildlife Authority. 1997. Draft multi-year implementation plan for resident fish protection, enhancement and mitigation in the Columbia River Basin. Technical Planning Document. June 3, 1997.
- Idaho Department of Fish and Game. 1966. Fisheries management plan 1996-2000. Boise, ID.

Northwest Power Planning Council. 1994, amended 1995. Columbia River Basin Fish and Wildlife Program. As amended in 1995. Portland, OR.

Ratliff, D.E.; Howell, P.J. 1992. The status of bull trout populations in Oregon. In: Howell, P.J.; Buchanan, D.V., eds. Proceedings of the Gearhart Mountain bull trout workshops; 1992 August; Gearhart Mountain, OR. Corvallis, OR: Oregon Chapter of the American Fisheries Society: 10-17.

Rieman, B.E. and McIntyre, J.D. 1993. Demographic and habitat requirements for conservation of bull trout. Gen. Tech. Rep. IN-302. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 39 p.

Shepard, B.; Pratt, K.; Graham, P. 1984b. Life histories of westslope cutthroat and bull trout in the upper Flathead River basin, Montana. Kalispell, MT: Montana Department of Fish and Wildlife, and Parks. 85 p.

State of Idaho. 1996. Governor Philip E. Batt's State of Idaho Bull Trout conservation plan.

b. Proposal objectives.

Overall Project Goal: Protect and restore native bull trout to self-sustaining, genetically viable population in the North Fork Clearwater River above Dworshak Dam.

The overall project objectives are: 1) Determine movement patterns of bull trout in Dworshak Reservoir and N.F. Clearwater River; 2) Develop and implement strategies to minimize entrainment at Dworshak Dam.

1. Determine movement patterns of bull trout in Dworshak Reservoir and N.F. Clearwater River.

Hypothesis: Entrainment losses of bull trout from the N.F. Clearwater River may be in excess of the 10% of the adult population.

Assumption: Bull move into Dworshak Reservoir from the N.F. Clearwater River for the abundant prey species kokanee and are entrained through Dworshak Dam as the reservoir is evacuated for flood control.

2. Develop and implement strategies to minimize entrainment at Dworshak Dam.

Hypothesis: Entrainment losses of bull trout from N.F. Clearwater River through Dworshak Dam can be minimize by flow manipulations and/or placement of avoidance structures.

Assumption: Bull trout may avoid entrainment through Dworshak Dam by placement of strobe lights or other structures or by flow manipulation movement patterns through the reservoir could be changed.

The first objective of this project is to document the loss of bull trout from the N.F. Clearwater River system. If the determination of the results of this study show a substantial loss of fish (genetic variability) then an assessment will need to be made to determine how significant this loss is to population viability. Additional a substantial loss will result in the need to incorporate this information in the BPA funded fish entrainment investigation presently ongoing. The entrainment study (Dworshak Dam Impacts Assessment and Fisheries Investigation, Project No. 87-99) is evaluating the use of strobe lights to reduce entrainment of primarily kokanee through Dworshak Dam. Using radio tagged bull trout, the effectiveness of strobe lights or flow manipulation at Dworshak Dam to deter entrainment can be evaluated. On the basis of the information collected strategies to minimize entrainment will be developed and proposed for implementation.

Loss of bull trout from the N.F. Clearwater River above Dworshak Dam could exacerbate the risk of extinction for that population because of the loss of genetic viability. Bull trout entrained through Dworshak Dam and from other tributaries of the Clearwater River cannot enter the N.F. Clearwater River and provide genetic interchange within the system.

The goal of the FWP is to make a determination of the long-term sustainability of bull trout in the Columbia River Basin (Measure 10.5A). This project will provide needed information as to the extent of bull trout (and genetic variation) loss in the N.F. Clearwater River drainage above Dworshak Dam.

c. Rationale and significance to Regional Programs.

The overall goal of this project mirrors the goals of the NPPC's FWP, IDFG's Fish Management Plan, CBFWA's MYIP, and Idaho's Bull Trout Conservation Plan. The goal of all of these documents is the protection and restoration of native fishes in native habitats. This project will follow a logical sequence of steps designed to protect and recover wild native salmonids. Specifically the goal of the FWP is to make a determination of the long-term sustainability of bull trout in the Columbia River Basin (Measure 10.5A). This project will provide needed information as to the extent of bull trout (and genetic variation) loss in the N.F. Clearwater River drainage above Dworshak Dam.

Loss of bull trout from the N.F. Clearwater River above Dworshak Dam could exacerbate the risk of extinction for that population because of the loss of genetic viability. Bull trout entrained through Dworshak Dam and from other tributaries of the

Clearwater River cannot enter the N.F. Clearwater River and provide genetic interchange within the system.

This is a native species project designed to benefit native fish by removing threats to their existence. Nothing in this project will adversely impact native fish.

d. Project history

No past history

e. Methods.

Bull trout will be captured in Dworshak Reservoir by netting and angling techniques. Both of these methods have proven effective in southern Idaho reservoirs. Bull trout in stream above Dworshak Reservoir will be captured by angling and electroshocking techniques. All fish will be initially held in recirculating tanks and anesthetized prior to tagging and measurements taken. Total and fork lengths and weights will be taken for all fish captured. Sampling effort will be concentrated in the lower stretch of the North Fork Clearwater River and the upper section of Dworshak Reservoir. Bull trout over 14 inches (350 mm) will be radio tagged. The tags will be inserted in the abdominal cavity. A maximum of 50 bull trout will be radio tagged annually for a three-year period. All other bull trout will be individually marked with VIT and PIT tags. After the initial marking all bull trout subsequently captured will be observed for marks.

Radio tracking will occur at a minimum of once every two weeks. This will be accomplished by either boat on Dworshak Reservoir, or vehicle on the roaded sections along the N.F. Clearwater River, both above and below Dworshak Dam. At least once per month radio tracking may be conducted using fixed wing aircraft covering the reservoir, the N.F. Clearwater River and the mainstem Clearwater River if there is an indication that fish may have moved downstream of Dworshak Dam. Monitoring of marked, but not radio-tagged, bull trout will be accomplished by netting and angling in the reservoir, and by electroshocking the river above the reservoir and below Dworshak Dam once a month as water conditions allow.

f. Facilities and equipment.

The project's field crew will be stationed at IDFG's Clearwater Region Office in Lewiston, ID. At that facility, the necessary clerical staff, office space, computers, etc., are available. IDFG will provide necessary vehicles including a boat suitable for use on Dworshak Reservoir. IDFG also has electroshocking equipment suitable for the sampling work required.

g. References.

- Carl, L. 1985. Management plan for bull trout in Alberta. In: MacDonald, D.D., ed. Proceedings of the Flathead River basin bull trout biology and population dynamics modeling information exchange. Cranbrook, BC: British Columbia Ministry of Environment, Fisheries Branch: 71-80.
- Columbia Basin Fish and Wildlife Authority. 1997. Draft multi-year implementation plan for resident fish protection, enhancement and mitigation in the Columbia River Basin. Technical Planning Document. June 3, 1997.
- Idaho Department of Fish and Game. 1996. Fisheries management plan 1996 - 2000. Boise, Idaho.
- Northwest Power Planning Council. 1994, amended 1995. Columbia River Basin Fish and Wildlife Program. As amended in 1995. Portland Oregon.
- Ratliff, D.E.; Howell, P.J. 1992. The status of bull trout populations in Oregon. In: Howell, P.J.; Buchanan, D.V., eds. Proceedings of the Gearhart Mountain bull trout workshops; 1992 August; Gearhart Mountain, OR. Corvallis, OR: Oregon Chapter of the American Fisheries Society: 10-17.
- State of Idaho. 1996. Governor Philip E. Batt=s State of Idaho Bull Trout conservation Plan.
- Rieman, B.E.; McIntyre, J.D. 1993. Demographic and habitat requirements for conservation of bull trout. Gen. Tech. Rep. IN-302. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 38 p
- Shepard, B.; Pratt, K.; Graham, P. 1984b. Life histories of westslope cutthroat and bull trout in the upper Flathead River basin, Montana. Kalispell, MT: Montana Department of Fish and Wildlife, and Parks. 85 p.

Section 8. Relationships to other projects

While BPA is funding projects on Dworshak Reservoir to address the impacts to resident fish species, no work has been directed to bull trout. The project would complement those projects that are emphasizing kokanee entrainment. In addition this study will complement ongoing bull trout inventory work in the North Fork Clearwater River drainage being conducted by the Idaho Department of Fish and Game under the Fish

Restoration Program. The Fish Restoration Program effort could, in fact, provide bull trout for marking and provide some monitoring of marked fish.

Section 9. Key personnel

Project Manager: Tim Cochnauer PhD

Position: Regional Fish Manager, Idaho Department of Fish and Game, Clearwater Region,

Address: Idaho Department of Fish and Game
Clearwater Region
1540 Warner
Lewiston, ID 83501

Phone: 208-799-5010
FAX: 208-7995012

Education: Doctorate in Fishery Resources, 1983, University of Idaho, Moscow, ID

MS in Zoology, 1973, University of Oklahoma, Norman, OK

BS in Zoology, 1967, University of Oklahoma, Norman, OK

Current responsibilities:

As regional fish manager, the project manager has responsibility for both anadromous and resident fish populations and fisheries within the Clearwater Region of north central Idaho. The area encompasses the entire Clearwater River drainage, the Snake River drainage up to Hells Canyon Dam, the Palouse River drainage and the Salmon River drainage (North side) from its mouth upstream to Horse Creek (rkm 300). The Clearwater Region has a staff of four fishery scientists conducting a variety of activities including data collection, creel census, management decisions, setting and implementing fishing seasons, etc. throughout the region. The staff has responsibility for the FWP funded Idaho Supplementation Study and Natural Production Monitoring and Evaluation projects within the region.

The project manager has over twenty years with the Idaho Department of Fish and Game working both in fish research and fish management. Experience include radio-tagging and monitoring a variety of fish species found in Idaho, marking and monitoring chinook salmon and steelhead trout juveniles and adult during the rearing, spawning and migratory phases of their lives, using a variety of sampling techniques for capturing different life history phases of different species of fish. These techniques include electroshocking, gill nets, angling, instream rotary screen and travelling screen traps, seining, instream weiring.

Publications:

Cochnauer, T. 1992. Idaho Rarest Fish. Idaho Wildlife. Idaho Department of Fish and Game. Boise ID

Cochnauer, T., E. Schriever, and J. Brostrom. 1993. River and Stream Investigations. F-71-R-17. Federal Aid in Sport Fish Restoration. Idaho Department of Fish and Game.

Cochnauer, T., E. Schriever, and J. Brostrom. 1994. River and Stream Investigations. F-71-R-18. Federal Aid in Sport Fish Restoration. Idaho Department of Fish and Game.

Cochnauer, T., E. Schriever, and J. Brostrom. 1995. River and Stream Investigations. F-71-R-19. Federal Aid in Sport Fish Restoration. Idaho Department of Fish and Game.

Cochnauer, T., E. Schriever, and J. Brostrom. 1996. River and Stream Investigations. F-71-R-20. Federal Aid in Sport Fish Restoration. Idaho Department of Fish and Game.

Principal Investigator: Fishery Technician (Graduate student) To be assigned

Education: Individual must have completed requirements for bachelor's degree and accepted as a graduate student at the University of Idaho.

Section 10. Information/technology transfer

The information collected will be presented in quarterly and annual reports to the funding agency. Overall significant finding will be submitted for publication in appropriate refereed professional journals. In addition the primary investigator will make oral presentation to fishery professional groups annually or as requested.